

LOCALITIES FOR COLLECTING IN MEXICO

by

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INTRODUCTION

In this paper we provide notes on some particularly interesting localities visited during an extensive collecting trip in Mexico, in the course of which we visited all of the Mexican states except Baja California. (Fox, 1963 presents valuable information on collecting in Baja California). Also included is some general advice for collectors. This trip extended from July 1965 to September 1966, and was supported by National Science Foundation Grant GB-3312. Our objective was to obtain a working collection of Carabidae to form a base for a revision of the Mexican species of this family.

Ball's family rented a house in Mexico City (the choice of locale being determined by schools and other facilities), and from this base we made trips usually of about 30 days duration to specific areas.

Our vehicle was a $\frac{3}{4}$ ton Ford truck chassis, 4-wheel drive, with a 14 foot cab-over camper mounted on it. The camper was equipped with a propane stove, a ten gallon water tank, electric lights running off the battery, bunks, a table, cupboards and closets. We also carried two extra 6-volt batteries to operate our blacklights, extra water, and an extra ten gallons of gas in two five-gallon metal gas cans, mounted on the back bumper of the camper.

References we found useful are cited at the end. The maps we used are listed under MAPS in the reference section. The most complete road atlas is the "Guia" (1963). The map of Mexico and guide book published by the American Automobile Association are useful.

GENERAL INFORMATION AND ADVICE

To save space, statements in this section are dogmatic. However, we do not claim to be experts for our experience is limited. We will be glad to furnish additional information, on request.

FOOD.—In general, we avoided restaurants, subsisting instead on meals that we prepared. Most larger Mexican towns have supermarkets where one can buy a fair variety of canned goods as well as other food. We found it most convenient to stock up on all but perishable goods in Mexico City sufficient to last each trip.

White bread can be purchased from grocery stores in most towns, and is about the same as white bread in the north. "Bimbo" is a popular brand, and there are several others. Local bakeries provide very good hard rolls called "bolillos," as well as other breads and pastries.

Representative prices for canned goods bought in Mexico City are as follows: meat dishes—from \$0.26 (pork and beans) to \$1.43 (ham); vegetables—from \$0.21 (tomatoes) to \$1.00 (carrots); juices—\$0.13. A large box of salt crackers costs \$0.45 and filled cookies are \$0.60 per two pound box. Bread is about \$0.25 per loaf. Fresh bacon is about \$0.50 per pound and eggs are about \$0.50 per dozen. We spent about \$3.50 per day for food for two.

ALCOHOLIC BEVERAGES.—Beer costs about \$2.06 per case (24 bottles), if bought directly from a distributor rather than from a food store. Rum, tequila, and mezcal are about \$1.00 per liter.

WATER.—We bought purified water, about \$0.16 for 20 liters. Most of the

smaller towns do not have this commodity, so carry a good supply. Frequently, soft drink bottling plants sell pure water.

HEALTH.—Keep yourself and your eating utensils clean. If you eat in restaurants, avoid uncooked food, such as salads. Carry insect repellent and use it regularly, especially in the tropics. The repellent "Off" repels not only biting Diptera but chiggers and ticks. It is available in Mexico but only in the larger centers. Take a supply with you. Carry a supply of "Halazone" tablets to purify water. Carry a standard first aid kit plus a supply of some potent pain killer, such as morphine.

CAMPING.—We camped by the roadside, but always a fair distance from the nearest town on the hypothesis that the probability of being robbed varies directly as the number of people likely to pass the vehicle. The farther one is from town the fewer are the passers-by. We had no trouble. We were always careful to leave a clean campsite, meaning that we buried the garbage and other refuse. We urge others to do the same.

ROADS, CARE OF VEHICLE, AND DRIVING.—The main highways in Mexico are good, two-lane, paved roads. In the vicinity of Mexico City are divided 4-lane highways. Many of the gravel roads are in good condition, but there are many very rough roads, especially in the mountains.

Use the best grade gas—"Pemex Cien." It is in yellow pumps at gas stations, and is generally available. The next best is "Gasolmex," in green pumps. Have your vehicle greased and change the oil regularly. Carry with you chains for the tires, tow chain, shovel, saw, axe, an extra fan belt, and battery jumper cable, as well as standard tools.

In general, confine driving to the daylight hours, and proceed with caution. Most of the country is open-range and there is an abundance of livestock with a penchant to stand in or stroll across the roadways. In small towns, drive slowly. Try to avoid driving in or through Mexico City.

On rough and rocky mountain roads, drive slowly, and by slowly we mean three to five miles per hour. If you intend to frequent the back country, be sure to have heavy-duty tires—at least two-ply heavier than you normally use.

In the event of car trouble, do business with the nearest small mechanic shop ("taller mecanico"). Chances are, you will get a good job done at a reasonable price. The larger garages are to be avoided. Tires cannot be repaired at gas stations, but must be taken to a "vulcanizadora."

In cities, keep your vehicle locked, and at night park it under a street light (this advice is good for any large city anywhere).

Be sure to have an insurance policy that is valid in Mexico. This can be purchased at the border. Car insurance is expensive, but necessary.

THE LAW.—Be well within it. Always have your entry papers with you. Don't get in trouble, but if you do, try to get to a lawyer before the police get to you. The basis of the legal system in Mexico is Napoleonic law which means that the accused must establish his innocence.

"GETTING ALONG WITH THE NATIVES."—In general, Mexicans are friendly and in the country they are unabashedly curious. Wear a smile rather than a gun and be courteous to passers-by. For a few pesos, the curious who stop to visit are glad to provide assistance. We found some excellent collectors this way.

NOTES ON COLLECTING

IN LITTER.—Collecting in litter can be a very frustrating business, yet may

also be exceedingly productive. Very thin, dry litter in arid areas (*Acacia*), especially if worked before the heat of the day becomes excessive, can produce surprisingly large numbers of beetles; no special equipment is required other than nimble fingers. In wetter areas, where leaf litter is fairly thick, one should look particularly for places strewn with the remains of pulpy, many-seeded fruits. Beetles of wide variety tend to congregate in such areas, notably carabids and staphylinids.

The "drowning" or litter washing method described by Darlington (1961) can be a very efficient means of extracting the macrofauna from thick litter under certain circumstances—a reasonably rich and dense fauna, and a nearby source of water. At one locality (32.5 miles east of Comitán, Chiapas) we found a dry, abandoned water trough meeting these requirements; its dimensions were about two meters square. After carefully sifting through all of the litter by hand that had accumulated in the bottom of the trough, we carried the litter to a nearby impoundment and washed it. This little experiment about doubled the take, and clearly demonstrated that even quite large insects (e.g., *Notiobia*) can easily be otherwise overlooked.

When sifting through litter, one is well advised to use tough, rawhide gloves. These greatly reduce trouble with biting or stinging animals and thorns and spines—all of which may be plentiful in all types of forests, particularly in the lowlands.

ON MOUNTAIN TOPS.—We visited a number of the higher peaks, including Orizaba and Colima as described later. In general, the carabid fauna diminishes rapidly as one approaches tree-line. On Orizaba, only one carabid was found above 13,000', though a species of the silphid genus *Pteroloma* was abundant to the extreme edge of the ice fields. (For a clear account of the geological history of the great Mexican volcanoes see Clausen, 1959.)

IN MARSHES.—The marsh fauna generally seemed remarkably poor as well as difficult to collect. At one exceptionally productive (for Mexico) marsh, 31.8 miles east of Escarcega, Campeche, we found 18 genera and at least 26 species of carabids, but fared not nearly so well anywhere else.

IN BROMELIADS.—During most of the dry season, by far the most productive method of collecting was through the harvesting of arboreal bromeliads. (Strangely, the giant bromeliads of the rain forests harbored very few beetles.) The predominant carabids represented in the bromeliads of arid lowlands were of the tribe Lebiini, whereas at higher elevations, especially in such wetter forests as the mossy woods, the Agonini took over.

For example, from the bromeliads in a single tree in dry tropical deciduous forest (22.0 miles east of Jalapa, Veracruz, 1000') we found 13 species and 192 specimens of Lebiini, no agonines, and two species and 16 specimens of other carabids. From a single tree in an elfin woodland area 12.0 miles south of Sola de Vega Oaxaca, 7100') the totals were 3 species and 9 specimens of Lebiini, versus 8 species and 194 specimens of Agonini. At an intermediate sort of locality (an oak-pine forest, 34.5 miles north of Pochutla, Oaxaca, 4700') the results were: Lebiini, 50 specimens of 7 species; Agonini, 174 specimens of 10 species; and others, 3 specimens of 2 species.

All of the above collections were made in March. By way of comparison, the 7100' locality mentioned above, was revisited in July. Although the ground fauna had by then improved enormously, the bromeliad fauna was very poor; in two

trees we found only 13 carabids, or about 3% as many per tree.

Techniques for collecting the bromeliads varied depending on specific circumstances. Probably the most generally efficient method was to cut down the trees. But often, the bromeliads could be most easily collected by climbing the tree, using ropes or driving in spikes if necessary. After they were harvested, the bromeliads were torn apart on a beating cloth, and the beetles collected immediately to prevent flying (particularly important in hot, dry areas). Because many of the bromeliads had very spiny tips and others housed scorpions, the use of heavy duty gloves was sometimes advisable. The bromeliads were quite productive for many other kinds of beetles, notably lagriids.

DURING THE DRY SEASON (November to May).—Aside from bromeliad work, collecting at this season is almost hopeless. A few habitats are relatively unaffected; the species of the riparian fauna, for instance, seem to be active year-round. The season when precipitation is reduced ("dry" season) occurs at the same time throughout the country. In the early part of the year, collecting was poor even in the wettest sorts of forests at all elevations.

AREAS VISITED

These are listed by the state in which they occur, alphabetically, and geographically within each state. Distances are in miles, from the nearest edge of a town. The point of reference for the edge of a town is usually the sign post bearing the name of the town.

The names of the forest types are from Leopold (1959) and from Beard (1944 and 1955). Beard (1944) provides a useful key to the tropical American forest formations.

CHIHUAHUA.

THE ROAD TO CREEL.—Few roads suitable for vehicles are found on the eastern slopes of the Sierra Madre Occidental. One of these is the road to Creel. This joins the main highway west of the city of Chihuahua (Route 16), from the south, at about the sign post for Kilometer 166. The road, which leads to Miñaca, is poorly marked.

Proceed through Miñaca on a road which crosses the railroad tracks, to the east of town. The road crosses a grassland mesa, descending into a wooded valley (oak-pine), at the bottom of which is an old hacienda, "San Pedro," 4.9 miles south of Miñaca. The road crosses the river continuing south on another grassy mesa. The road forks 7.2 miles south of Miñaca. Take the right fork. A pine forest is entered 14.2 miles south of Miñaca, the road traversing a valley to the Mesa de los Pozos. The road proliferates here into a number of seemingly equally good roads—all go to the same place. At 16.9 miles south of Miñaca, a forestry checking station is reached. Turn right, past the station. The road descends into a steep-walled canyon with a stream at the bottom which must be forded. Across the stream, the road traverses a side canyon in which the creek must be crossed about 16 times. At 28.6 miles south of Miñaca, the road forks. Stay to the left. We continued beyond this point for another 7.4 miles, and then turned back.

The road traverses open meadows, dry pine-oak woods, wet aspen-fir-Mexican pine forest, and wet mountain meadows, rising from 6400' at Miñaca to a high of 8200'. There is excellent cover and collecting in many places along the way, especially in the rolling grassland 1.0 miles south of Minaca. At 31.9 miles south of Minaca (8100', just over the crest) is a rich mountain meadow (at margin of corn fields); the adjacent slopes, clothed in aspen-fir-Mexican pine forest, were burnt over in 1963 but not destroyed though ground cover was badly damaged.

CHIAPAS.

PALENQUE (RUINS) AND VICINITY.—Palenque is located about 130 miles south-east of Villahermosa, Tabasco. A new road, almost complete (paved in places, otherwise good gravel) starts from the eastern side of Villahermosa and extends to Escarcega, Campeche. Palenque is south of this road. Ask for directions in Villahermosa. The road passes through low, wet country mostly devoted to agriculture and totally ruined for collecting. However, about 59 miles southeast of Villahermosa (Kilometer 95) is some relatively undisturbed rain forest. The road to Palenque joins the main road at the town of Catazaga, marked by a truck inspection station ("caseta fiscal"). The ruins are in the hills flanking the Chiapas highlands, about 12 miles from the town of Palenque and at an elevation of about 400'. Ask for directions to the "Ruinas" in Palenque. Outside the gate at the ruins is a flat, grassy area suitable for camping, and within the enclosure is an area for swimming. Soft drinks and beer can be purchased near the museum.

Immediately at hand is some dense rain forest, with shaded valleys and fairly deep leaf litter on the ground. In general aspect, the flora and fauna here seem very similar to that found in the vicinity of Sontecomapan, Veracruz.

THE PUEBLO NUEVO SOLISTAHUACAN AREA.—The town of Pueblo Nuevo Solistahuacan (or simply Pueblo Nuevo) is located on the lower northern flank of the Central Highlands of Chiapas, on Route 195. It can be reached from Route 190 (Entrada Escopetazo, about 12.2 miles northeast of Chiapa de Corzo, Chiapas), or from Villahermosa, Tabasco. It is about 80 miles from the Route 190 junction, and about 110 miles from Villahermosa. The former road is better. During the dry season, the road is passable for all types of vehicles, but we do not recommend driving over it in a standard-type low-clearance American car.

In general, the country to the south of Pueblo Nuevo is rather dry, supporting pine-oak forest; wetter areas have been completely taken over by coffee plantations. To the north, with a decrease in altitude, the road passes through the remains of tropical evergreen forest. The Pueblo Nuevo area is interesting because here one finds on hill tops and ravines cloud forests or their remains, as well as relatively undisturbed pine-oak forest. We collected in the following localities.

23.6 miles south of Pueblo Nuevo, 4200'—tropical deciduous forest, on a dry, west-facing slope; bromeliads.

3.1 miles south of Pueblo Nuevo, 5400'—damp oak-pine-sweetgum forest, in a small valley; bromeliads.

3.1 miles north of Pueblo Nuevo, 5800'—pine woods near road; cloud forest on hilltop to east of road. The slopes are steep, and the cloud forest is above a corn field.

6.6 miles north of Pueblo Nuevo, 5100'—tropical montane forest in an east-facing, very wet ravine densely shaded and with steep sides; also on upper slopes, to about 5600'.

11.6 miles north of Pueblo Nuevo, 5100'—tropical montane forest (possibly "mossy woodland"), in a narrow, densely shaded, steep-sided ravine; trees with an abundance of moss and epiphytes; creek clear, cool, evidently permanent.

THE OCOZOCUAUTLA AREA.—North of Ocozocuatla, in the Atlantic drainage system are forested areas. The town of Ocozocuatla (labelled on some maps as Ocozocuatla de Espinoza) is located about 21 miles west of Tuxtla Gutierrez, on Route 190. The road to the north joins Route 190 on the western side of

Ocozocuautla (the junction is slightly west of a gas station on the north side of the highway). It passes over a ridge rising to about 3500' and then descends gradually. We drove only 25 miles northwest of Ocozocuautla, and the elevation on the road at this point was 2400'.

The forests are being destroyed, but there seems to be an abundance of undisturbed areas on either side of the road. Dense oak forest with an abundance of epiphytic bromeliads grows at higher elevations, and this grades into tropical montane forest at lower elevations. We did not encounter any permanent streams along the road.

We camped just off the road 11.6 miles north of Ocozocuautla in the oak forest on top of a ridge which to the west descends precipitously into a forested valley with an intermittent stream in the bottom. In March, we had success collecting in the bromeliads. In June, the bromeliads were unproductive, but blacklight collecting was fairly good. At both times of the year, the forest litter was dry and the litter fauna very sparse.

RANCH NUEVO.—This is a local designation for an area about 6.5 miles east of San Cristobal de las Casas, on Route 190. A dirt road joins the highway on the south side near a fence marking the western border of a re-forestation zone. This road traverses a rather wet open pine forest. It is passable by vehicle for about a mile south of the highway. The road ascends a mountain and is an admirable foot trail.

The pine forest on the flats is replaced by an oak-pine forest on the lower portions of the mountain slope, and at higher elevations one encounters in depressions what seems to be an impoverished cloud forest formation (including abundant *Chiranthodendron*), the trees and shrubs with a rich covering of moss and deep litter on the ground. On the flats are small grassy meadows near the bed of a temporary stream. The elevation on the flats is about 7100', and the top of the adjacent mountain is about 10,000'.

THE SAN QUINTIN AREA (Fig. 1).—This is in the midst of tropical rain forest, 16° 24' N., 91° 20' W., at an altitude of 707'. We stayed at a semi-permanent camp of the Comision Federal de Electricidad. The camp is located near the junction of the Rivers Jatate and Perlas, between the rivers. It was necessary to go in by plane, carrying all food and equipment for a two-week stay. We flew from San Cristobal de las Casas (round trip for two—\$96.00). The town of Comitán, however, is a better point of departure because it is at a lower elevation; consequently, a plane can take off safely carrying a heavier load, and further, the air field is less likely to become fog-bound.

At San Quintin, the person in charge was Señor Gabriel Guilleron M., mailing address Comision Federal de Electricidad, Zona San Quintin, Avenida Central No. 125, Tuxtla Gutierrez, Chiapas. He speaks and reads Spanish, only.

The camp and the adjacent airfield are in a savanna. The larger part of the savanna is across the Jatate. Otherwise, the surrounding country is all tropical forest, undisturbed except that mahogany trees were removed. The canopy is more or less open, and the leaf litter on the forest floor is generally shallow.

To the east, across the Perlas, is Lake Miramar, a beautiful body of water with a sand beach. A good trail leads to the lake, extending through the forest. About a mile west of Lake Miramar is a much smaller lake, Miramar Chiquita; it is surrounded by a fine swamp forest.

To the west of the Jatate is a forested mountain range, the Sierra de Colmena.

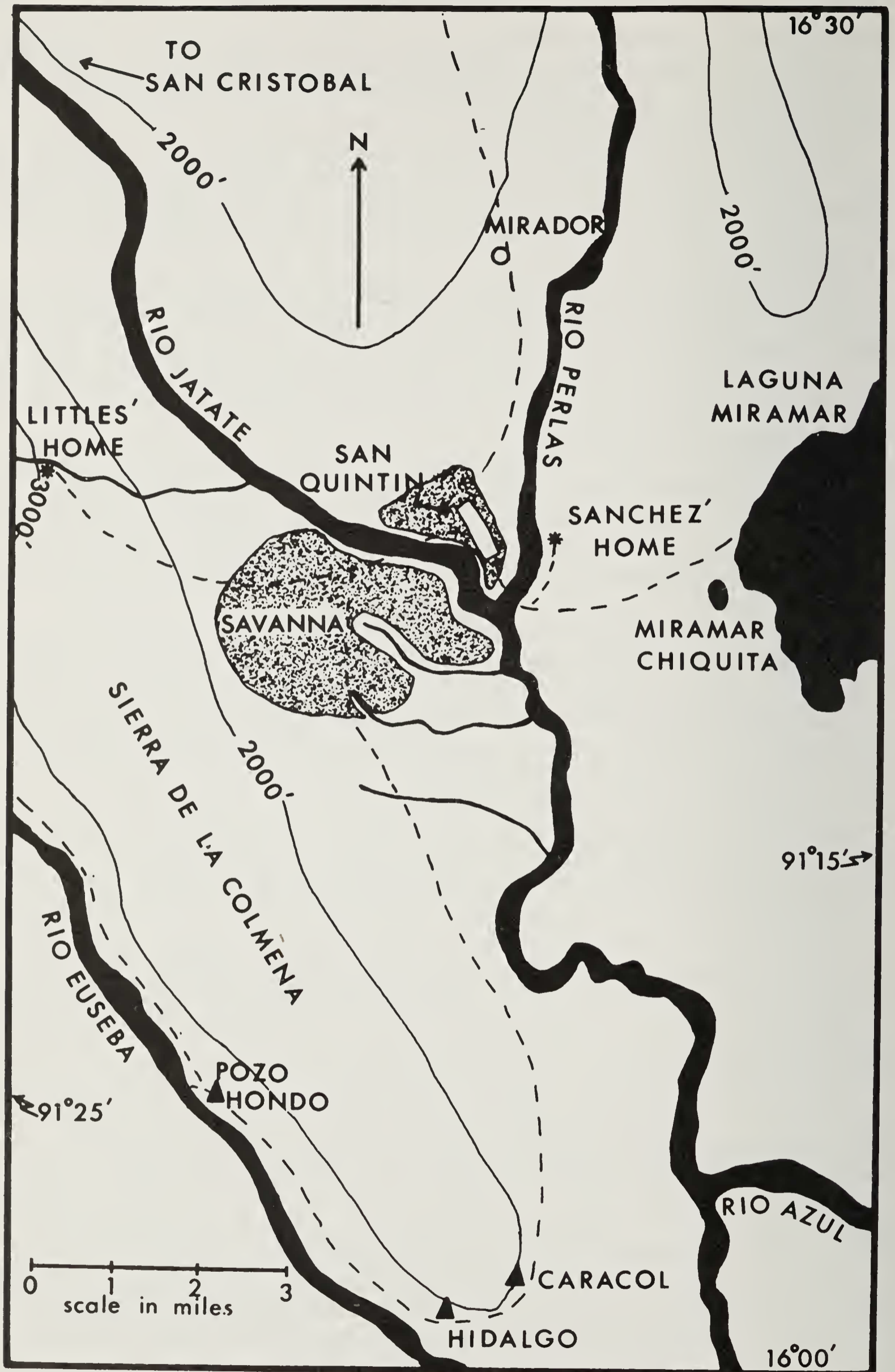


FIGURE 1. Map of the San Quintin, Chiapas area.

Legend: triangles—location of towns; stars—location of private houses; circle—location of Mirador, a lookout point; rectangle—air field at San Quintin; dashed lines—trails.

There are good but poorly marked trails to the Sierra; they cross the savanna and one should be accompanied by a guide because it is easy to become lost.

The rivers are quite different. The water in the Jatate carries a large quantity of red silt, whereas the Perlas water is clear. One finds sand or gravel banks along the Perlas, and clay or fine sand banks along the Jatate. In general, the banks are steep, the beaches are small and probably flooded during the rainy season.

Notes.—Although no one at the Electricidad camp spoke English, nearby were people who did. Señor Rudolfo Sanchez lives near the eastern bank of the Rio Perlas, directly across from the camp, and Enrique Little, his wife Juana and their daughter live on the slopes of the Sierra de Colmena, about five miles from the camp. These people know the area well and can provide a lot of useful information.

As a guide we hired an Indian, Señor Alonzo Sontez Comes, who lives at the southern end of the airfield. We hired Alonzo by the day, mainly to show us the trails. As long as one stays near the trails in the jungle there is little danger of becoming lost. A map of the area showing the trails can be purchased from Mrs. Franz Blom, Bibliotheca Fray Bartolomé, San Cristobal de las Casas, Chiapas.

We found the San Quintin area a delightful place to spend some time and recommend it highly to persons interested in the tropical biota of Mexico.

THE FRONTERA-COMALAPA AREA.—About 51 miles southeast of Comitán a gravel road from the south joins Route 190. This road, which is suitable for ordinary passenger cars, terminates at the town of Frontera-Comalapa (on most maps, simply Comalapa), about 11.6 miles from the junction with Route 190. The road passes through a range of low hills following the course of a small creek to its origin, and then descends into the valley in which Frontera-Comalapa is located. The hills are quite dry and the stream is intermittent. We collected in the following localities: (Mileages are north of Frontera-Comalapa.)

0.9, 2100'—semi-evergreen seasonal forest, mainly deciduous; in vicinity of a dry stream bed.

2.9, 2200'—cut-over evergreen seasonal forest.

4.9, 2400'—dry evergreen forest on a side road to Colonia Verapaz, with cacti and ground bromeliads in understory; limestone outcrops.

7.7, 2600'—oak forest, with acacia and ground bromeliads; soil predominantly dry, sandy loam, with some humus. A tropical deciduous forest grows above the oak forest, on the eastern side of the road. The oak forest is of very limited extent.

THE HUIXTLA-MOTOZINTLA ROAD.—This road is on the southern slopes of the Sierra Madre de Chiapas. It is gravel with a fairly good bed. Its worst feature is a very long, steep grade. The road joins Route 200 at Huixtla and probably ends at Motozintla (we did not drive to Motozintla).

The road passes through tropical evergreen forest, tropical deciduous forest, oak-pine forest, elfin woodland and finally, open meadows at about 6000'. The latter may be the result of clearing. The most interesting area we encountered with a patch of elfin woodland in a ravine and on a steep slope 33.7 miles north of Huixtla. The soil was very damp, under a fairly deep layer of leaf litter. The trees and rocks were covered with moss, and trees supported a rich growth of bromeliads. A small stream was in the ravine bottom.

COLIMA.

THE MANZANILLO AREA.—East of Manzanillo 12.8 miles, on Route 110 is a relatively undisturbed tropical forest consisting mainly of tall palm trees, probably of the genus *Dorbignya*. Dead palm fronds litter the ground. Unfortunately, we were able to spend only a couple of daylight hours here, and we obtained a poor but very interesting fauna. Black light collecting would probably be highly profitable.

DURANGO.

THE LA FLOR-LAS CEBOLLAS AREA.—These small communities are located in a range of mountains south of the city of Durango. Inquire in Durango for directions. The distance to La Flor is 50 miles; to Las Cebollas, 75 miles. The main road passes through La Flor, not to the west of it as indicated on some maps. The road is passable for a truck but is very rough. We drove continuously for seven hours to La Flor. From La Flor to Las Cebollas our time was about four hours. From grassland-desert in the vicinity of Durango, the vegetation changes gradually to scrub-oak-Manzanita woodland, to oak-pine woodland at higher elevations, and finally to pine-fir forests in protected canyons. The country is generally very dry but is wetter between La Flor and Las Cebollas. The elevation at La Flor is 8700', and at Las Cebollas it is 7700'.

We had good collecting in two places. The better site was at Arroyo Hondo, elevation 7500', to the east of the La Flor-Las Cebollas road, and about six miles south of La Flor. This canyon is northeast-southwest oriented and has a permanent cold, clear stream. The banks are gravel and rubble. The dominant trees are oak and pine but fir trees grow in small areas near the stream. A rather lush flora grows near the water; farther up the slopes it is drier and grasses take over in the understory.

The second site we collected at was 8.3 miles north of Las Cebollas, at 9100'. This is the highest point on the road. Fir and pine trees are dominant and it is generally a relatively damp area.

NOTES.—Located in this same range is a town called El Refugio, and we think we have good reason to believe that this is the "Refugio, Durango" referred to in the *Biologia Centrali-Americana*. Our evidence is that Refugio is the type locality of *Scaphinotus macrogonus* Bates and we collected specimens of this species at the sites mentioned above. These are the only known specimens of this species other than the type series and a single specimen labelled "Ciudad." Selander and Vaurie (1962) were unable to decide which of several "Refugio" localities in Durango was the one referred to in the "Biologia." We attempted to visit El Refugio but the road was blocked by a flooded creek.

GUERRERO.

OMILTEMI (OR OMILTEME) AND ENVIRONS.—This is one of the classic collecting areas in Mexico, located in the Sierra Madre del Sur.

The road to Omiltemi can be traversed safely by trucks, jeeps and possibly by Volkswagen sedans, but we think it is too rough for ordinary passenger cars.

The Omiltemi road joins Route 95 on the western side of Chilpancingo about 0.5 miles south of a tourist information center. At the junction is a small green building, a forestry checking station. The road heads due west, into the mountains. About 2.6 miles west of the junction, the road forks. Keep to the right. The road passes through a town 3.4 miles east of the fork and Omiltemi is about 12 miles beyond this town.

Originally a ranch (Goldman, 1951:152), Omiltemi is now a very small logging town. In the town, the road turns left rather sharply and proceeds up a forested slope, into a more or less cleared area about a mile from town. We camped here. It is possible to drive a mile or so farther, but the road becomes very bad. Distances noted below are miles west of Chilpancingo, unless otherwise specified.

8.4, 4900'—cleared and formerly farmed land, on steep slopes, probably near edge of what was once tropical deciduous and oak forest.

12.1, 6100'—open forest of oak, juniper and some palms.

13.9, 6300'—vicinity of ponds, in a rather narrow canyon: vegetation oak-pine-palm forest.

0.9 mi. e. Omiltemi, 6700'—in a narrow, heavily forested canyon with steep sides and a clear, cold creek; forest of pine and oak, with *Alnus* near creek.

About one mile west of Omiltemi, 7300-8000'—cloud forest consisting of various tropical trees, above oak-pine forest, on slopes of ravines; several tree ferns seen in one valley (Goldman, 1951:153 states that tree ferns were "plentiful"); good cover on ground, including deep leaf litter and logs; poison ivy in wet places.

JALISCO.

THE NEVADO AND VOLCAN DE COLIMA.—These peaks are reached from the vicinity of Atenquique, a small town west of Route 110, and south of Ciudad Guzman. Several roads lead to Atenquique. We approached from the north.

Drive through Atenquique on the main road. This turns left (at this point, a monument is on the right and a bus station is on the left), crosses a bridge over a river, extends through a park and continues straight across a traffic circle. A short distance past the circle, the road ascends a steep hill. Beyond the circle 1.5 miles, the road forks, the left leading to Tonila, the right to the mountains. From this point it is about 20 miles to the highest point on the road, about 10,000', in the saddle between Nevado and Volcan. The road though basically smooth is steep in places and deeply rutted. We had to walk the last few miles because of a deep rut that we could not cross in the vehicle.

The cleared land at the base of the mountains gives way to dry oak-pine-madroño forests at lower elevations on the open slopes. In the more protected sites in the canyons through which the road winds, are stands of fir, and at higher elevations are oaks and alders covered with ferns and mosses. In the saddle between the peaks of the Nevado and Volcan, the forest is replaced by herbaceous vegetation, including willows and large lupines. The vegetation terminates at about 10,400' on the south-facing slope of the Nevado.

We did not see any water on the mountain slopes, but we crossed a number of dry stream beds.

MORELOS.

THE CUERNAVACA PEDREGAL AND CANON DE LOBOS.—These areas are located along the paved Route 136, between Cuernavaca and Yautepec. This road joins Route 95 on the eastern side of Cuernavaca and extends across a lava field (pedregal). About 7 miles east of the junction, the road descends into and winds through Cañon de Lobos. The road is narrow but there are a few pull-offs on the north side of the road where one can park. At the bottom of the Cañon is a stream bed with flowing water during the rainy season.

The vegetation in these areas is tropical deciduous forest, with trees of many

species, about 40' high. Large organ pipe cacti are numerous. Leaf litter and soil are thin.

The best place we found on the pedregal was about 5.4 miles east of Route 95-136 junction. At this point, a small road leads toward a gravel pit (can be seen from the road) and ascends a small hill past the pit. We camped in this area.

In Cañon de Lobos, we camped 9.1 miles east of Route 95-136 junction, and collected along the stream bed directly below our campsite.

NUEVO LEON.

SANTA ROSA CANYON.—This canyon is west of Linares and is traversed by Route 60 (see Howden, 1966: 20, Map 1). At a point 14.8 miles west of Linares, a gravel road joins Route 60, enabling one to drive off the highway. A small cleared area is along this road between the highway and the creek bed. This is suitable for camping.

In the canyon bottom are sycamores, walnut trees and very large oaks supporting bromeliads. The steep canyon walls support a rich tropical deciduous vegetation. We did not find much here, but because the area looks very promising, we probably visited this area at the wrong times (October and early July).

OAXACA.

THE ROAD FROM OAXACA (CITY) TO VALLE NACIONAL.—This is an unnumbered road which can be reached either from the vicinity of Oaxaca to the south or from San Juan Tuxtepec, Veracruz, to the north. The most interesting areas are between Oaxaca and Valle Nacional, in the Sierra Madre de Oaxaca. The distance between these points is about 110 miles. The road is all-weather but is very rough, in places very steep, and often the bed is paved with large stones. It is wide enough for vehicles to pass without difficulty and there are pull-outs suitable for parking at frequent intervals. It is possible to cover the distance in a day of virtually continuous driving.

The road joins Route 190 from the north about five miles southeast of Oaxaca, about opposite a large monument to a great Mexican president, Benito Juarez. The road crosses one ridge at an elevation of about 8000' descends to the Rio Grande valley, and then ascends again to the north of Guelatao, attaining a maximum elevation of 9200'. The descent to Valle Nacional (ca. 200') is long, steep and treacherous.

From Oaxaca to Valle Nacional, the country becomes progressively wetter. The higher parts of the ridge between Oaxaca and the Rio Grande support oak-pine forests. Between Guelatao and Valle Nacional one passes through oak-pine forest to boreal forest at the higher elevations (9000'). At about the highest point on the road is a broad, lush meadow. Mossy or elfin woodland occurs on the ridge top also and on the higher parts of the northeastern slopes. It is replaced by cloud forest around 6000', and this gives way to montane or tropical evergreen forest. In the vicinity of Valle Nacional, the forest is badly cut over.

The northern slopes of the Sierra Madre de Oaxaca are very steep and it is virtually impossible to work on them. We collected at the following points, indicated in miles south of Valle Nacional:

6.5, 2000'—a small flat area, suitable for camping, and environs, adjacent ridge top supports a stand of oaks.

16.9, 3600'—tropical montane forest in vicinity of a small pond.

27.5, 5600'—Mexican cloud forest (tree ferns, rich growth of moss, epiphytes); clear, swift-flowing creek.

32.8, 6200'—Mexican cloud forest, rich growth of epiphytes.

35.7, 6900'—oak forest on steep slope, with rich understory of shrubs.

38.2, 8200'—Mexican cloud forest, mainly broad-leaved trees, some pines; several creeks.

48.1, 8500'—seemingly rather dry oak-pine forest, on west-facing slope.

53.8, 8300'—pine forest and wet meadow.

60.6, 7400'—oak forest, grading into pine; rather dry.

64.5, 6500'—oak-pine forest, with many bromeliads.

72.5, 4100'—vicinity of Rio Grande.

88.5, 8000'—madroño-oak-pine woods, rather dry.

89.2 —dry oak forest, with some bromeliads.

97.3, 7900'—margin of agricultural land, in cut-over oak-pine woods.

Notes.—We recommend use of blacklights to collect in the tropical evergreen forest, and possibly molasses or simple pitfall traps in strategic places. Black flies in this area transmit onchocerciasis. Liberal use of repellent is therefore recommended.

THE OAXACA-PUERTO ANGEL ROAD.—This is Route 175 extending south from Oaxaca, across the Sierra Madre del Sur, to the Coastal village of Puerto Angel. The distance is about 116 miles of which the first 62 miles of road is paved. Beyond the town of Miahuatlan the road is rough and it required about 10 hours of continuous driving to reach Puerto Angel.

The road reaches a maximum elevation of about 8700', five miles south of San Juan del Pacifico, passing from agricultural land at lower elevations to dry oak-pine forest on the northern slopes of the mountains. At higher elevations on the southern slopes, wetter forest is encountered, especially in protected valleys. In turn, drier oak-pine forest occurs on the lower Pacific slopes, and this is replaced by remnants of montane tropical forest in the upper reaches of canyons. The readily accessible parts of this plant formation are devoted to coffee. The montane forest is replaced by tropical deciduous forest on the Pacific coastal plain. We crossed streams at several places on both the northern and southern slopes of the Sierra.

We collected at the following localities between San Miguel Suchixtepec and San Pedro Pochutla. To the north of Suchixtepec and south of Pochutla it was too dry to find anything when we were there in March. All distances are given in miles. San Miguel Suchixtepec:

3.4, 7100'—wet canyon, well shaded, heavily wooded, upper slopes with pine and a more or less open understory; near clear, cold creek a dense, almost impenetrable tangle of shrubs among the tall alder bushes. A similar canyon was found at 10.6, 6800'.

18.4, 4500'; 19.1, 4500'; and 22.3, 4700'—east-west oriented canyons, wider and drier than those mentioned above, with streams in bottom, in oak-pine zone; bromeliads on trees.

22.5, 4700'—oak-pine zone, on steep upper slopes of a broad, dry canyon, to east of road; collected from bromeliads in oak trees.

23.4, 4500'—oak-pine zone; a small seep beside road, with moss on rocks.

36.7, 1400'; 38.4, 1100'; and 47.1, 700'—Cut-over tropical montane forest; collected from bromeliads and along streams.

THE OAXACA-PUERTO ESCONDIDO ROAD.—This road joins Route 175 about 10 miles south of Oaxaca and crosses three ridges of the Sierra Madre del Sur.

From the junction to Puerto Escondido the distance is 190 miles. The maximum elevation of the road is 7100', attained 12 miles south of Sola de Vega. It is paved to the base of the first ridge, a distance of about 35 miles. The road is good for an additional 70.1 miles, to the summit of the third ridge, and is terrible for the next 85 miles. West from Puerto Escondido, a paved road extends along the coast. We followed it for only nine miles, but it may extend to Acapulco.

In general, the road traverses dry oak and oak-pine country but near the tops of the southern slopes of the ridge Mexican cloud forest is encountered and cut over montane tropical forest occurs at lower elevations on the Pacific slopes of the southernmost ridge. On the coastal plain is tropical deciduous forest as well as palm forest and mangrove swamp to the west of Puerto Escondido. We collected at the following localities:

42.7 miles south of jct. with route 175, 6100'—oak forest on steep, east-facing slope; bromeliads.

42.9 miles south of jct. with Route 175, 6000'—along margins of a small dry creek bed, bordered by corn field and a small stand of oak; good collecting under stones.

12.0 miles south of Sola de Vega, 7100'—cut-over Mexican cloud forest at top of a southeast-northwest-oriented canyon; Spanish moss and other bromeliads numerous; litter very dry in March but damp in July.

20.7 miles south of Sola de Vega, 4700'—oak forest, bordering a cypress stream, in an east-west oriented canyon; bromeliads; palmettos.

Rio Atoyac at Juchatengo, 2900'—along river and in grassy fields, near bridge.

15.4 miles south of Juchatengo, 5600'—oak-pine forest on steep slopes of a small canyon; bromeliads; black flies numerous in March.

20.9 miles south of Juchatengo, 6300'—wet oak-pine forest on steep slopes; Pacific drainage.

22.2 miles south of Juchatengo, 5800'—montane tropical forest, in west-facing, steep-sided ravines; water in creeks cold; understory dense; leaf litter rather thin.

28.5 miles south of Juchatengo, 4200'—montane tropical forest in a deep, steep-sided ravine; water in creek bed; understory dense, numerous vines.

83.4 miles south of Juchatengo, 2100'—oak forest in midst of tropical deciduous forest; litter rather deep.

PUEBLA.

PICO DE ORIZABA (CITLALTEPETL).—The higher parts of this mountain are most easily reached from the west, from Route 144. It is possible to get to an elevation of about 13,000' by road.

The road to the volcano joins Route 144 about 3.5 miles north of Ciudad Serdan, Puebla, at about a bearing of 45°. It is unmarked, and goes right through extensive corn fields. A drive of five miles brings one to Guadalupe Ocotengo. Drive through the town to the far side of the square and turn left. In 3.7 miles, one comes to Tlachichuca, and here directions to San Miguel Zoapan should be asked for, as well as directions for crossing the town. East of Tlachichuca 2.4 miles is an old hacienda, and the road forks here. Bear to the left. The road passes between the hacienda and a field in which are standing the remains of small stone buildings, probably once the houses of field workers. From the hacienda to San Miguel Zoapan the distance is 4.0 miles. At the entrance of the town, the main road terminates in a cross road. Go left here, around the town. The town of San Miguel Hidalgo is 2.8 miles further. Here, ask for directions to "El Volcan,"

or better still, ask for Manuel Lopez, who, for a small fee, will guide you to the mountain (Señor Lopez is an affable, intelligent individual. Although he speaks only Spanish, for the benefit of foreigners he does so clearly and slowly). From San Miguel Hidalgo to the end of the road the distance is 5.3 miles. At the end is a hut belonging to the "Legion Alpina de Puebla." A foot trail leads up the mountain to the snow fields.

In general, the road is terrible beyond the hacienda mentioned above, and should not be attempted without a rugged, high-clearance vehicle.

To an elevation of about 10,500', the country is generally devoted to agriculture but between the hacienda and San Miguel Zoapan along a dry stream bed, is a stand of pine forest, and above 11,000' is open pine forest with fir stands in the more protected sites. On the northwestern side of Orizaba, the forest extends to an elevation of about 11,800'. The herbaceous vegetation above tree line consists mainly of a species of grass (zacatal?) on gentle slopes and flat places, with small clumps of *Juniperus*. On steep slopes, and above 13,000', the continuous carpet of vegetation ceases and small herbs and lichens grow among the rocks. At 15,000' is the end of a snow field from which issues a stream.

QUERETARO.

THE ROAD TO PINAL DE AMOLES.—This road extends from Route 85, south of Huichihuayan, San Luis Potosi, to San Juan del Rio, Queretaro, ascending the eastern slopes of the Sierra Madre Oriental. We drove from the eastern terminus only as far as the summit of the ridge known as Pinal de Amoles.

The road passes through the remains of tropical evergreen forest (vicinity of Xilitla), oak-pine forest, desert, temperate deciduous forest, and pine forest. A number of streams are crossed. We collected at the following sites:

9.6 miles east of Xilitla, 1400' and 6.0 miles west of Xilitla, 3000'—banana and coffee plantations.

24.7 miles east of Landa de Matamoros, 5000'—sweet gum forest with some oak, pine and alder, on steep, north-facing slope; stones covered with moss.

17.8 miles east of Landa de Matamoros, 5300'—oak-pine forest with madroño; understory of grasses and herbs; lots of cover—litter and logs.

Landa de Matamoros, 3400'—open field with grasses and herbs, beside road; acacia bushes.

Rio Jalpan, near Jalpan, 2600'—clear stream with gravel and rubble banks; large cypress trees near water.

6.4 miles east of Pinal de Amoles, 6000'—at base of a steep slope along margins of a forest of tall, straight oaks, on damp ground near a small creek bed.

2.2 miles west of Pinal de Amoles, 8300'—near or on summit of mountain, cut-over pine-oak forest; meadows; soil damp.

SAN LUIS POTOSI.

EL SALTO.—Howden (1966:21 and Map 2) describes the El Salto area. He does not mention, however, the *Sabal* palmetto forest which is along the El Salto Road, within a half mile of its junction with Route 80. We obtained here, in October, under the dead palm fronds on the ground, a larger number of carabid species than anywhere else in Mexico. However, collecting was poor in July, when we visited the area for a second time.

TAMAULIPAS.

THE VILLA DE CASAS-LA PESCA ROAD.—This is one of the few roads to the coast between the Rio Grande and Tampico. About five miles south of Ciudad Victoria, a road going east to Villa de Casas joins Route 85. To Villa de Casas

(or Casas on some maps), a distance of about 27 miles, the road is paved, and is on flat terrain. Beyond Casas, the road is not paved but is wide and well surfaced to about 10 miles west of Soto la Marina. From here to the Rio Soto la Marina, the road follows the telephone line, is narrow and tortuous. The river, which must be forded, is wide and over two feet deep. The town of Soto la Marina is on the far bank of the river. Ask in town for directions to La Pesca. The road beyond Soto la Marina is terrible. Near La Pesca, the outlet of a lagoon must be forded.

As far as Villa de Casas, one sees only agricultural land. Beyond Casas, the road crosses the Sierra de Tamaulipas attaining an altitude of about 1500' and passes through some interesting low tropical semi-evergreen forest. Beyond Soto la Marina, the vegetation is mainly tropical deciduous, but about 10 miles from the coast is a band of fine thorn forest, the best we saw in Mexico. Some trees in the thorn forest support small bromeliads.

The shore at La Pesca is sandy-clay, with a thin covering of shells. The beach itself is only a few feet wide and immediately behind it is a continuous mat of vegetation, consisting mainly of grasses. Presumably the barrier beach to seaward is sandy. We did not investigate this, but it should be possible to rent a boat at La Pesca, should one want to do so.

THE SIERRA DE GUATEMALA AND FIELD STATION OF TEXAS SOUTHMOST COLLEGE.—This mountain range is to the west of Route 85, between Ciudad Victoria and Ciudad Mante. Two roads ascend the eastern slopes, one from the town of Gomez Farias and one from El Encino. The latter road is the better and is used by logging trucks. It is the only road going west from El Encino. This town is on Route 85, between the turnoff to Gomez Farias and Llera.

About three miles west of El Encino the road crosses the Rio Sabinas on a causeway and forks shortly thereafter. The left fork heads up the Sierra. Under the best of conditions, this is a hazardous road and is best not attempted in a vehicle lacking 4-wheel drive. It is possible to arrange for a ride in a logging truck. After a drive of about two hours, a small logging town is reached. The road passes through the town and turns left and terminates six miles from here (more than an hour of driving time) at the field station, elevation about 3800'.

This mountain range has on it the northernmost stands of Mexican cloud forest in the east. The climate and vegetation are described in detail by Martin (1958. Note—the Encino road is not on Martin's map). At present, Texas Southmost College operates a field station on the old Rancho del Cielo, a site made famous in the scientific literature by Aaron Sharp, George Sutton, Dwain Warner, Byron Harrell, Richard Robins and Paul Martin, with the aid and cooperation of the late proprietor of the ranch, W. Frank Harrison. The college welcomes visiting scientists to its field station. For details, write to Mr. C. J. Garland, President, Texas Southmost College, Brownsville, Texas.

Our collecting was confined to the forest in the vicinity of the ranch.

VERACRUZ.

THE SONTECOMAPAN AREA.—The town of Sontecomapan (Sontecomatlan on some maps) is located at the base of the San Andres Tuxtla Mountains. It is reached by the road which is along the north shore of Lake Catemaco and is about 10 miles northwest of the town of Catemaco (see Howden 1966: 22 for details). The gravel road is in fairly good shape. Beyond Sontecomapan, the road passes through more or less cut-over tropical evergreen or rain forest, but 2.5 miles west of Sontecomapan, on the right side of the road near a small clearing and rather

swift-flowing stream is a small patch of relatively undisturbed forest. The forest extends up-slope, along the stream. Downslope, the creek turns east, toward Sontecomapan, and flows eventually into a lagoon. Along the margin of the lagoon is some wonderful undisturbed swamp forest in water about two feet deep, but with dry leaf-covered hummocks here and there. About 4.2 miles farther northwest along the road, one encounters relatively undisturbed forest, but on very steep slopes. The road was impassable beyond this point.

THE CANYON OF THE RIO METLAC.—This canyon is located between Orizaba and Fortin de las Flores, off Route 150. The entrance to the road into the canyon is on the northeast side of the bridge named "Puente San Miguel". A power plant of the Cerveceria Moctezuma is about two miles from the highway and is located in a lovely park beside the Rio Metlac. It is possible to camp here, but permission must be obtained in advance from the manager of the station, Ing. Camilo Gomez Correa, Planta Hidro-Elctrico, Sumidero, Veracruz.

The vegetation of the canyon is tropical montane forest, but sycamores grow along the river. Much of the canyon floor has been cleared, but not all of it and there is plenty of forest on the steep canyon walls. Collecting was excellent here from August to January, but for the latter part of the winter into early summer, we found few insects.

At the head of an adjacent canyon to the west is a waterfall in a large cave. This is interesting to see, and one walks through cloud forest or elfin woodland to get there.

ADDENDA

1. The destruction of lowland forests in Mexico is proceeding at an incredible rate. For example, the patch of rain forest 2.5 miles west of Sontecomapan, Veracruz, described above, was almost totally destroyed between June, 1966 and August, 1967, and large portions of the palm forests near Manzanillo, Colima were destroyed in about the same interval of time.

2. Regulations currently in effect require individuals collecting biological material in Mexico to have permits. See "The Pan-Pacific Entomologist", 43(1): 87-88 (1967) for relevant details.

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